PROC. ENTOMOL. SOC. WASH.
90(1), 1988, pp. 52–54

UNUSUAL OVIPOSITION BEHAVIOR ON EVERGREEN AZALEA BY THE ANDROMEDA LACE BUG *STEPHANITIS TAKEYAI* (DRAKE AND MAA) (HETEROPTERA: TINGIDAE)

JOHN W. NEAL, JR.

Florist and Nursery Crops Laboratory, Horticultural Science Institute, Agricultural Research Service, U.S. Department of Agriculture, Building 470, Beltsville, Maryland 20705.

Abstract.—The andromeda lace bug, *Stephanitis takeyai* (Drake and Maa), an adventive tingid from Asia, has a feeding host range in North America of twelve species in the Lauraceae, Salicaceae, Ericaceae and Styracaceae. Hybrid evergreen azalea (*Rhododendron* sp.) is reported as a new feeding and breeding host. Females oviposit in the midrib of the azalea leaf, a behavior different from that on its preferred host, Japanese andromeda (*Pieris japonica*). A comparison is made of oviposition site behavior between the andromeda lace bug, and *S. pyrioides* (Scott) the azalea lace bug.

Stenophagous lace bugs in North America have been assigned common names based on the major reproductive hosts. Minor feeding hosts usually involve congeneric species. Drake and Ruhoff (1965) report that "All species [of lace bugs] are rather highly specialized in their food habits, and generation after generation live on the same kind of plant or closely related ones." Host plants of the andromeda lace bug *Stephanitis takeyai* (Drake and Maa) (= *S. globulifera* Matsumura), an adventive tingid from Asia (Schread 1953), have been reported by Drake and Ruhoff (1965), Schread (1953), Dunbar (1974), and Wheeler (1977) and world-wide include 12 species in Lauraceae, Ericaceae, Salicaceae and Styracaceae. Bailey's (1951) review of New England tingids contains a report that a few *S. takeyai* were found in association with azalea lace bug, *S. pyrioides* (Scott), on a single deciduous azalea *Rhododendron* sp. in Connecticut. Bailey (1974) also reported *S. takeyai* on *Rhododendron calendulaceum* (Michx.) Torr. Wheeler (1977) reported specimens in the U.S. National Museum of Natural History from azalea at a nursery in Falls Church, Virginia, June 1969.

Dunbar (1974) reported that *S. takeyai* oviposits on the abaxial leaf surface, usually along the side of the midrib of the Japanese andromeda *Pieris japonica* (Thunb.) D. Don, and that overwintering eggs are found along the midrib but on occasion were distributed over the undersurface of the leaf.

I observed adults of *S. takeyai* in low numbers on evergreen and deciduous azaleas throughout Prince George's and Howard counties, Maryland. These observations suggested that azalea is used by *S. takeyai* as a minor host, and prompted this study and report of insect behavior, host fitness and potential pest status.

MATERIALS AND METHODS

Containerized Japanese andromeda harboring all stages of *S. takeyai* were purchased from a retail nursery in Burtonsville,

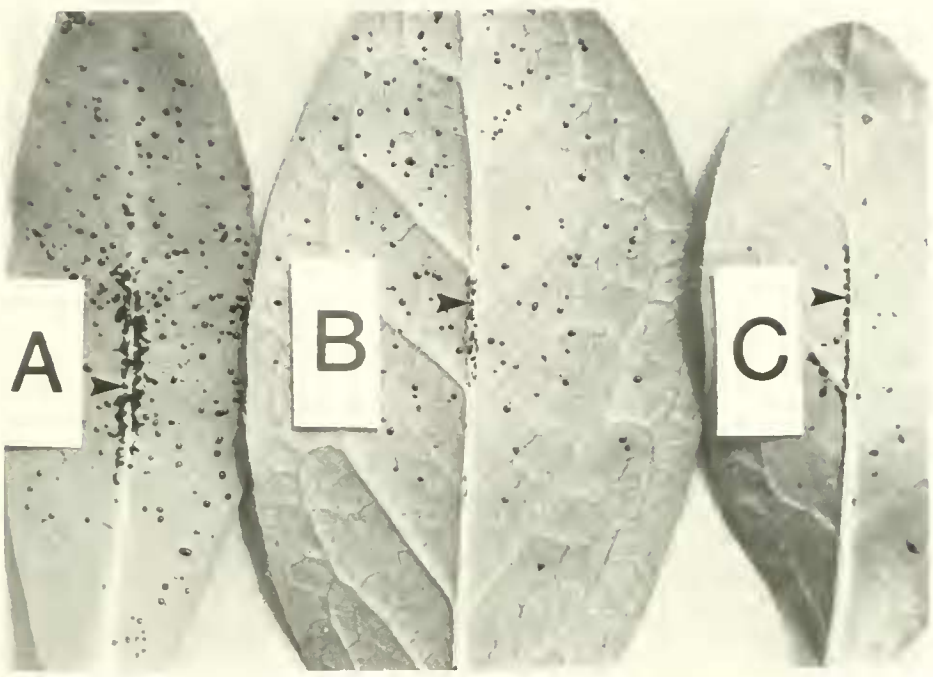

Fig. 1. (A) Frass-covered eggs of *S. takeyai* placed lateral to the midvein of an andromeda leaf, (B) Eggs of *S. takeyai* placed in the midvein of an azalea leaf, (C) Eggs *S. pyrioides* placed lateral to the midvein of an azalea leaf. Arrow identifies one of several frass-covered eggs.

Maryland. Plants were transplanted to 11.6 liter (3 gal) containers, held in a heated greenhouse, and watered as needed. Stems of various lengths were removed periodically to a bottle of water and placed in a gauze covered plexiglass cylindrical cage (32 cm high × 31 cm dia.) in a Sherer walk-in rearing chamber programmed at 26.1 ± 1°C, with a photoperiod of 14:10 (L:D).

To test for host preference and acceptability, stems of the evergreen hybrid azalea 'Martha Hitchcock' (*Rhododendron mucronatum* × Shinnyo-no-tsuki) were placed in the cylinder contiguous to the infested andromeda cuttings. Leaves with adults and nymphs of *S. takeyai* found on the azalea during daily observations were transferred for isolation to a similar cage containing an uninfested second azalea cutting. Transferred adults were allowed to feed and oviposit. Water was added to the bottle as needed. Both azalea and andromeda cuttings were introduced weekly to the cylinder with andromeda lace bugs, and the transfer of adults from andromeda to azalea was conducted over several weeks.

Leaves with eggs of *S. takeyai* were compared against leaves with eggs of *S. pyrioides* removed from the same azalea cultiver used as host plants to maintain a greenhouse colony.

Results

Tingids that leaf feed in an inverted position defy gravity and deposit their fecal material on the abaxial surface at random. Preliminary tests confirmed that by removing all frass by rinsing the leaf with warm running water, *S. takeyai* and *S. pyrioides* confined their egg laying either in or adjacent to the midrib or at major lateral veins depending on host. Defecation by the female on the operculum leaves a prominent mark at the egg site (Fig. 1, arrows). *Stephanitis takeyai* fed and oviposited on azalea cuttings. Originally some eggs on this host

hatched, but most failed to produce second instars. Washing leaves prior to hatch to remove sticky plant exudate greatly reduced first instar mortality; nymphs developed to the adults when foliage was washed. The presence of plant exudates on the cuttings is a phenomenon due to the growing of azaleas in the protective greenhouse environment. Exudates are normally reduced by rain or rendered non-sticky by the accumulation of airborne particles.

Stephanitis takeyai oviposited only in and along the midrib in all azalea leaves observed (Fig. 1B), whereas *S. pyrioides* deposited its eggs below and lateral to the midrib (Fig. 1C). Oviposition by *S. takeyai* on Japanese andromeda included periodic placement below and lateral to the midrib, but eggs were never inserted in the midrib (Fig. 1A). Andromeda leaves have conspicuous midribs, but they are not raised as in other hosts such as azalea, possibly accounting for this change in oviposition behavior. Wheeler (1977) found *S. takeyai* eggs inserted in the midvein of spicebush, *Lindera bezoin* (L.) Blume, and sassafras, *Sassafras albidum* (Nutt.). This ovipositional site preference by the andromeda lace bug on azalea and other hosts is unusual, because when compared, the andromeda lace bug oviposits on andromeda lateral to the unraised midrib which is similar to oviposition by the azalea lace bug below and lateral to the raised midrib on azalea. This behavior by *S. takeyai* on azalea raises the question what would be the oviposition site on andromeda if the midrib were raised.

These findings determined that an evergreen azalea can be a suitable feeding-breeding host for *S. takeyai*. Further, it was found that females oviposit in and along the midvein of the azalea leaf which is different than when on andromeda. Fertilized eggs hatched and nymphs developed to adults normally. These results suggest that *S. takeyai* could develop to be a late season threat to azalea production. There is, however, no data to suggest that eggs of *S. takeyai* overwinter on azalea.

Acknowledgments

Thanks are extended to Richard C. Froeschner (USNM) and Thomas J. Henry (USDA, SEL) for constructive comments and helpful suggestions on an early draft of the manuscript.

Literature Cited

Bailey, N. S. 1951. The Tingoidea of New England and their biology. Entomol. Am. 31: 1–133.

Bailey, N. S. 1974. Additional notes on *Stephanitis takeyai* in New England (Heteroptera: Tingidae). Psyche 81: 534–538.

Drake, C. J. and F. A. Ruhoff. 1965. Lacebugs of the World: A catalogue (Hemiptera: Tingidae). Bull. U.S. Natl. Mus. 243: 1–634.

Dunbar, D. M. 1974. Bionomics of the andromeda lacebug *Stephanitis takeyai*, pp. 277–289. *In* Mem. Conn. Entomol. Soc. 25th Ann.

Schread, J. C. 1953. Control of the andromeda lace bug *Stephanitis globulifera* and the holly leaf miner *Phytomyza ilicis*. Conn. Agric. Exp. Stn. Bull. 568: 1–13.

Wheeler, A. G., Jr. 1977. Spicebush and sassafras as new North American hosts of andromeda lace bug, *Stephanitis takeyai* (Hemiptera: Tingidae). Proc. Entomol. Soc. Wash. 79: 168–171.